TREASURE FINDER METAL DETECTOR KIT

Ramsey Electronics Model No. TF-1

Ahoy mates ! Go searching for buried treasure in your own backyard, nearby park, or on the beach. This professional quality unit can find metal at a depth of six inches!
Talk about your ideal project, this one will literally "pay for itself" finding hidden treasures!

- **Sensitive...you bet ! Uses a Faraday shielded search coil just like the pro's !**
- **Runs on 9-12 volts DC ; internal power regulation for "rock solid" performance.**
- **E-Z grip handle for comfortable use.**
- **"Breaks down" small enough to fit in a suitcase or backpack ... ideal for trips or hikes.**
- **Utilizes the Signetics® NE 602 mixer / oscillator integrated circuit for worry free operation.**
- **Convenient earphone output for earphone / headset operation.... volume limited to protect your eardrums!**
- **Complete and informative instructions guide you to a kit that works the first time, every time - enhances resale value, too !**

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TF-1 TREASURE FINDER METAL DETECTOR KIT INSTRUCTION MANUAL
Ramsey Electronics publication No. MTF-1 Revision 1.0
First printing: May,1998

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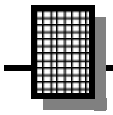
Ramsey Publication No. MTF-1
Price $5.00



INSTRUCTION MANUAL FOR

TREASURE FINDER METAL DETECTOR

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INTRODUCTION

Searching for buried treasure has been a childhood dream for most of us. If we could only “see” what's under a few inches of soil who knows what fascinating delights await us! Could it be antique coins, missing jewelry, or that coffee can that Gramps buried his fortune in?

But one look at the metal detectors on the market today and our dreams are dashed! Even the “inexpensive” versions of a metal detector unit may cost upwards of one hundred dollars; with the “professional” units selling for five to ten times more.

Enter the Ramsey TF-1 treasure finder metal detector unit. Using today's superior integrated circuit technology and a little physics know-how, we’ve come up with a great circuit that performs admirably with a minimum of tuning. With great sensitivity, selectivity, and ease of tuning we offer the easiest and most reliable way to start seeking buried treasure of your own!

TF-1 CIRCUIT DESCRIPTION

The following paragraphs describe some of the circuit theory for our metal detector kit. Have a look at the block diagram (pg. 5) and schematic diagram (pg. 12) and follow along.

We’ll start by describing the entire circuit operation with a simple block diagram. First of all let's get this search coil term figured out. What magic properties happen when you wind a few turns of wire? Well, remember when you hooked up that dry cell with the nail and the coil of wire? It did pick up a few paper clips, now didn’t it. This is due to the fact that a current through the wire creates a magnetic field around the core. By the same token, if we were to “cut” through this magnetic field with a wire, we would induce a voltage on the wire. This is the principle that the power company generators use to produce electricity, as well.

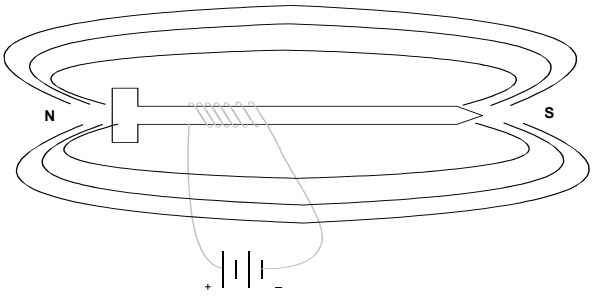
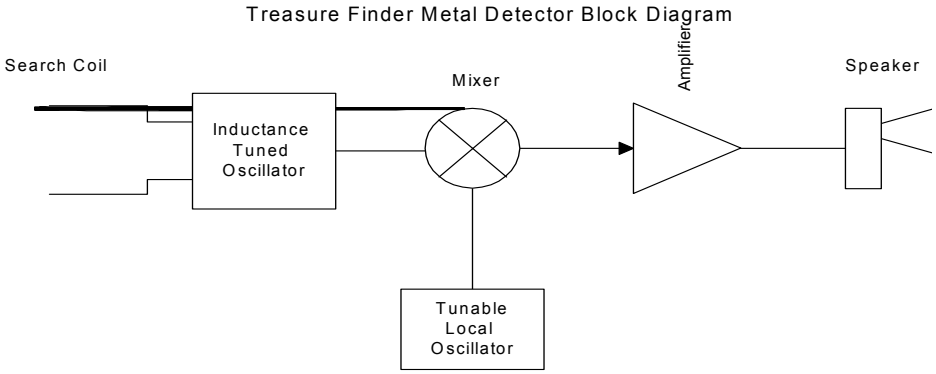


Figure 1 : Magnetism from a coil of wire

When that same coil of wire is used in an alternating current circuit, the nature of the search coil begins to show itself. As the electric current races back and forth through the wire (that's why they call it “alternating”), that magnetic poles are also oscillating back and forth.

So this oscillation is generating a “pulsating” magnetic wave. This magnetic wave expands and contracts around the coil. When this magnetic “wave” comes in contact with a metal object it induces a small voltage at either end of the metallic “target”. With this induced voltage across the target object, a small current begins to flow causing a “counter” magnetic field to be generated by the target metal. This opposing field interacts with the search coil, generating a counter reactance when metal is encountered. Since our search coil is designed to work with only the magnetic field generated by the coil, we can actually shield out the electric field interference by enclosing the coil in a “Faraday” shielding arrangement. Seems a little crazy to enclose most of our coil in a tube of copper, but it actually improves the performance of the search coil!

So how do we transpose this change in reactance to a changing tone? We use our coil in an oscillating circuit whose frequency is determined by the inductance of the coil. This high frequency oscillation is much too high for our senses to discern, however, so we need a way to make this changing inductance usable. This is accomplished by “mixing” the signal with another (local) oscillating signal. The mixer, simply put, combines the two input



frequencies and produces a sum (the inductance tuned oscillator + the reference oscillator, and the difference (the inductance tuned oscillator - the reference oscillator). This “mixed” (difference) frequency falls in the range of our hearing, and the change in the pitch of the tone is proof that the coil is in magnetic contact with some metal object.The frequency that we have chosen for the oscillator provides for an optimal mixing frequency for the mixer part of our circuit.

Now have a look at the schematic for the unit and follow along. The power source for the treasure finder kit needs to be regulated to provide for drift free operation of the two oscillator circuits that are contained in the kit. Diode

D3 is a zener type diode which accomplishes our regulation task. The power indicator LED provides a visual display when the circuit is energized.

The local oscillator section of the circuit consists of U1 and its associated components. This 8 pin chip contains a complete oscillator and mixer circuit. This amazing little chip takes the place of several functional “blocks” critical to our metal detector design. Since we will want to be able to slightly adjust our local oscillator input, we have provided a “varactor” diode tuning circuit in order to enable us to to change the frequency of our reference. We have used this particular IC for a few years now for a variety of applications and are still amazed at how it lends itself to more and more designs.

The oscillator comprised of transistor Q1 and it associated components (including the search coil) generates our probing magnetic field. Notice that the search coil is isolated from the rest of the circuit via a length of RG174 mini coaxial cable to provide for more stable measurements.

Components R6 and C10 make up our low pass filter that removes the unwanted mixer output (the sum of the LO and search coil oscillators) The difference between the two oscillators is amplified by U2, an audio amplifier integrated circuit. This IC can provide plenty of power to drive the small speaker, so we also limited the power for use with the optional earphone by adding a resistor (R10) in series with the headphone output.

TF-1 COMPONENTS LIST

Sort and “check off” the components in the boxes provided. It’s also helpful to sort the parts into separate containers (egg cartons do nicely) to avoid confusion while assembling the kit.

RESISTORS AND POTENTIOMETERS

- ❒ 1 2 ohm (red-black-gold) [R9]
- ❒ 3 120 ohm (brown-red-brown) [R2,10,13]
- ❒ 2 270 ohm (red-violet-brown) [R4,8]
- ❒ 2 1K ohm (brown-black-red) [R1,6]
- ❒ 2 10K ohm (brown-black-orange) [R3,5]
- ❒ 1 100K ohm (brown-black-yellow) [R12]
- ❒ 2 PC mount 10K ohm trimmer potentiometer (10K) [R7,11]

CAPACITORS AND INDUCTORS

- ❒ 1 470 pF disc capacitor (labeled 470 or 471) [C19]
- ❒ 2 .0015 uF disc capacitors (labeled .0015 or 1500K) [C5,17]

- ❒ 4 .01uF disc capacitors (labeled .01 or 103 or 10nF) [C6,10,16,13]
- ❒ 2 .01 uF Mylar capacitor (in a rectangular case [looks like a Chicklet] labeled 103) [C7,18]
- ❒ 6 .1uF disc capacitors (labeled .1 or 104) [C2,3,8,11,14,15]
- ❒ 2 10 uF electrolytic capacitor (labeled 10uF) [C1,4]
- ❒ 2 220 uF electrolytic capacitors (labeled 220uF) [C9,12]
- ❒ 1 100 uH inductor (coil on form with hex tuning slug) [L2]

SEMICONDUCTORS AND INTEGRATED CIRCUITS

- ❒ 1 6.2 volt zener diode (small gray glass case with banded end) [D3]
- ❒ 1 Varactor diode (MVAM 108) [D2]
- ❒ 1 Jumbo LED (light emitting diode) [D1]
- ❒ 1 NPN Transistor (three leads marked 2N3904) [Q1]
- ❒ 1 NE602 mixer oscillator IC (8 pin DIP IC marked NE602) [U1]
- ❒ 1 LM 386 audio amplifier IC (8 pin DIP IC marked 386) [U2]

MISCELLANEOUS COMPONENTS

- ❒ 1 PC mount push-button switch [S1]
- ❒ 1 PC mount mini jack [J1]
- ❒ 1 9 volt rectangular battery “snap” connector
- ❒ 1 9 volt battery clip
- ❒ 1 Miniature 8 ohm speaker [SP1]
- ❒ 2 17” pieces of 1/2 “ PVC tubing, one having slots cut in the end; one having three holes pre drilled
- ❒ 1 8 ” piece 1/2 “ PVC tubing
- ❒ 1 45 degree 1/2 “ PVC elbow
- ❒ 1 1/2 ” PVC endcap
- ❒ 1 1/2 ‘ PVC coupling
- ❒ 1 Foam grip handle
- ❒ 4 ’ RG-174 mini coaxial cable
- ❒ 35 ’ 24 AWG enameled magnet wire
- ❒ 18 ” 3/8 “ Diameter copper tubing
- ❒ 1 “Clamshell” abs plastic case with pre-punched panel set
- ❒ 1 Panel sticker set
- ❒ 2 #4-40 X 1 “ cover mounting screws
- ❒ 4 #4 x 3/8” self tapping screws
- ❒ 2 #6 type B self tapping screws

RAMSEY LEARN-AS-YOU-BUILD KIT ASSEMBLY

There are numerous solder connections on the TF-1 printed circuit board. Therefore, PLEASE take us seriously when we say that good soldering is essential to the proper operation of your metal detector!

- Use a 25-watt soldering pencil with a clean, sharp tip.
- Use only rosin-core solder intended for electronics use.
- Use bright lighting, a magnifying lamp or bench-style magnifier may be helpful.
- Do your work in stages, taking breaks to check your work. Carefully brush away wire cuttings so they don't lodge between solder connections.

We have a two-fold "strategy" for the order of the following kit assembly steps. First, we install parts in physical relationship to each other, so there's minimal chance of inserting wires into wrong holes. Second, whenever possible, we install in an order that fits our "Learn-As-You Build" Kit building philosophy. This entails describing the circuit that you are building, instead of just blindly installing components. We hope that this will not only make assembly of our kits easier, but help you to understand the circuit you're constructing.

For each part, our word "Install" always means these steps:

1. Pick the correct part value to start with.

2. Insert it into the correct PC board location.

3. Orient it correctly, follow the PC board drawing and the written directions for all parts - especially when there's a right way and a wrong way to solder it in. (Diode bands, electrolytic capacitor polarity, transistor shapes, dotted or notched ends of IC's, and so forth.)

4. Solder all connections unless directed otherwise. Use enough heat and solder flow for clean, shiny, completed connections.

5. Trim or "nip" the excess component lead wire after soldering.

NOTE: Save some of the longer wire scraps nipped from resistors and capacitors. These will be used to form wire jumpers (JMP1, etc.) to be soldered in just like parts during these construction steps.

Enough of that ... lets get started!

TF-1 METAL DETECTOR ASSEMBLY STEPS

Although we know that you are anxious to complete the assembly of your

treasure finder kit, it is best to follow the step by step instructions. Try to avoid the urge to “jump ahead” installing components.

Since you may appreciate some “warm-up” soldering practice as well as a chance to put some “landmarks” on the PC board, we’ll first install some of the larger mounting components. This will also help us to get aquainted with the up - down, left - right orientation of the circuit board. Remember that the majority of the components will be mounted on the “component “ side of the circuit board and soldered on the “solder “ side of the circuit board, the side with the printed circuit traces. Have a look at the component layout diagram to help with your assembly.

- ❒ 1. Install S1, the push-button switch. Be sure to push the part as close to the circuit board as it will go, as the alignment of this part is important in getting the case holes to line up with the part. Solder all six leads.

- ❒ 2. Identify and install the 10K trimmer potentiometer R11 (labeled 10K). Gently “rock” the component into place before soldering. Be sure to solder the mounting “tabs” into place to provide for a secure fit.

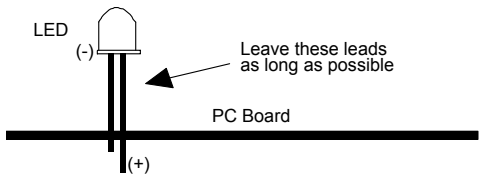
- ❒ 3. In the same manner, identify and install R7, another 10K trimmer potentiometer. Be sure that both the “knob” ends of the pots line up evenly for easy installation into the case.

- ❒ 4. Moving to the rear of the board, install J1,a PC mount miniature type connector. Again, be sure to push the component firmly into place. Solder all three connection points.

Now it’s time to build the power supply portion of the circuit. We use a zener diode regulation circuit for a voltage regulator to provide a stable source of power for the circuit. Zener diodes exhibit a characteristic of a very specific reverse biased “break down “ voltage, and this property is exploited by wiring the diode reversed biased with reference to the 9V supply. A 120 ohm resistor is placed in series with the diode to limit the amount of current that is allowed to pass through the zener.

- ❒ 5. Identify D3, the 6.2 volt zener diode (gray glass case with a polarity “band” denoting the cathode (negative) side of the diode. Install as shown in the parts placement diagram (D3 is adjacent to the battery input terminals).

- ❒ 6. Install R13, 120 ohm (brown-red-brown). Remember to save a few of the snipped off component leads to act as



"jumper" connection wires later. Resistors are not polarized, they may mount in either direction.

❒ 7. Install LED D1. Being a diode, this component is polarized and must be oriented correctly. Examine the LED and notice how one lead is longer than the other. The longer of the two leads is the anode, or (+) connection. Most diodes also have a flat side molded in the component body. This corresponds to the cathode or (-) side of the part.This flat should face in the direction of the band marking of the diode. Leave the diode leads as long as possible as this component will also mount to the front panel as a power indicator.

❒ 8. Install R1, 1K ohm (brown-black-red).

Now that wasn't so bad was it? You've just completed the power supply part of your treasure finder. Pretty soon you will be searching for shell casings at the scene of the crime!
Next we'll work on the local oscillator section of the circuit. Be sure to mount the components as close to the printed circuit board as possible to provide for reliable oscillator operation.

❒ 9. Install R12, 100K ohm (brown-black-yellow). It is located adjacent to the front panel pot R11.

❒ 10. Identify D2, the varactor diode (marked MVAM 108). Although it may at first look like one of the transistors, note that it only has two legs. Due to a change in the PC board, the diode must be installed with the flat side placed opposite of the way the silkscreen shows.

❒ 11. Identify and install L2, the "wire-wound" slug tuned coil. Remember to keep the parts as close to the circuit board as possible. Use care when installing this component as not to strain the mounting legs when inserting the part into the pc board.

❒ 12. Install C16, .01uF disc capacitor (marked .01 or 103 or 10nF). Remember to save those scrap component leads; you'll be needing them in a little while.

❒ 13. Install C19, 470pF disc capacitor (marked 470 or 471).

❒ 14. Install C2, .1 uF disc capacitor marked 104).

❒ 15. Install C8, another .1 uF disc capacitor marked 104).

❒ 16. Install C15, .1uF disc capacitor (marked 104).

❒ 17. Install C17, a .0015 uF disc capacitor(marked .0015 or 1500K).

❒ 18. Install C18, a .01 uF mylar capacitor (marked 103). We chose to use a mylar cap in this position because mylar caps show greater stability than standard ceramic disc caps; and since this is used in the oscillator frequency determining section we wish to keep this value as “rock solid” as possible.

❒ 19. Install U1, the NE602 mixer oscillator IC. Make sure to align the notch or dot associated with pin one with the notch shown in the parts layout diagram. Also check to be sure all 8 pins are through the board before soldering the IC in place. This IC is responsible for the local oscillator and mixing circuits and replaces a few dozen discreet components.

Great job! Take a moment now to check your previous solder joints for “opens” where the solder did not completely flow around the connection or solder “bridges” between closely spaced pads or IC pins. The best time to identify this type of problem is now when you're focused on this section of the board, saving you from problems later on.

Let's continue with the search coil oscillator section of the treasure finder.

❒ 20. Identify the small signal transistor Q1 (three leads marked 3904). Notice that there is a “flat” side of the component. Install transistor Q1, being sure to mount the flat side as shown in the parts diagram.

❒ 21. Install R8, 270 ohm (red-violet-brown).

❒ 22. Install C7, a .01 uF mylar capacitor (marked 103). Again, being an integral part of the oscillator circuit we are installing a high quality mylar type.

❒ 23. Identify and install C5, the .0015 uF disc capacitor (marked .0015 or 1500K). Keep those leads as short as possible.

❒ 24. Install C3, .1uF disc capacitor (marked 104).

❒ 25. Install R3, 10K ohm (brown-black-orange).

❒ 26. Install R2, 120 ohm (brown-red-brown).

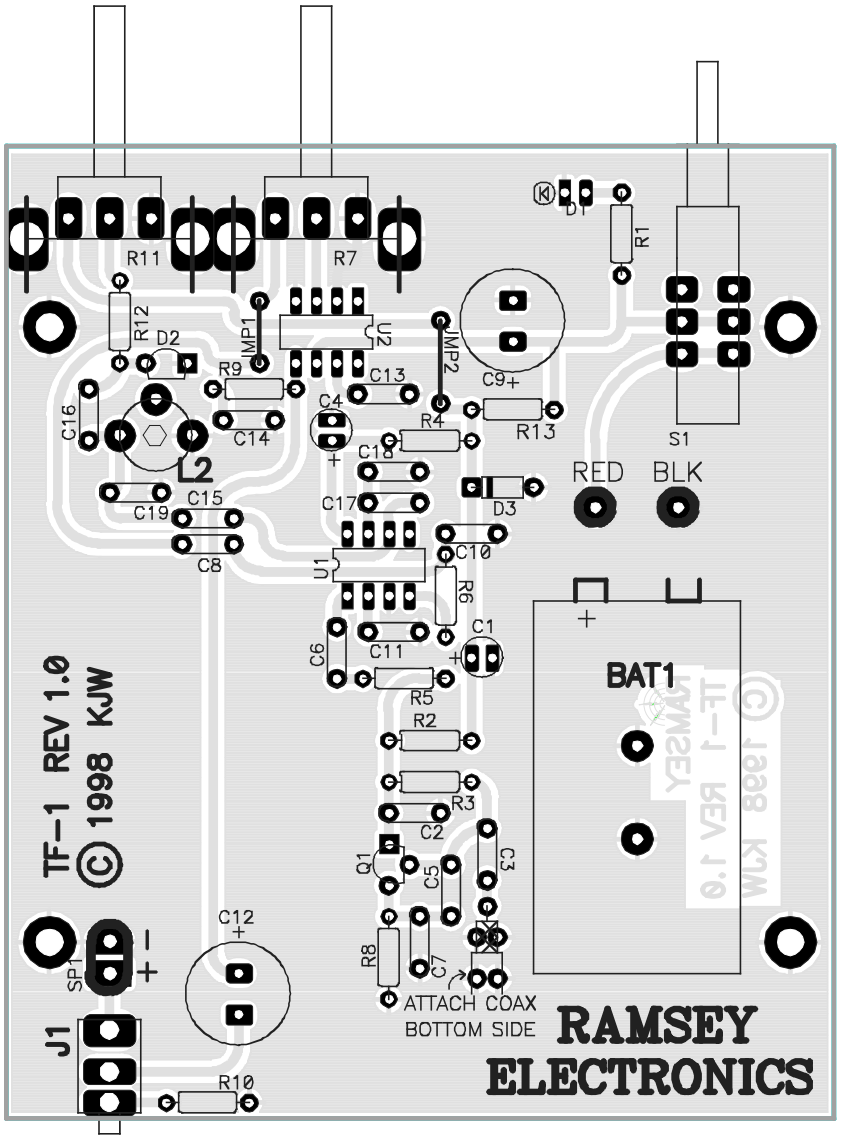
❒ 27. Install R5, 10K ohm (brown-black-orange).

❒ 28. Install C6, .01 uF disc capacitor (marked .01 or 103 or 10nF).

❒ 29. Install C11, .1uF disc capacitor (marked 104).

❒ 30. Install R6,1K ohm (brown-black-red).

TF-1 COMPONENT LAYOUT



❒ 31. Identify C1, the 10 uF electrolytic capacitor. Electrolytic capacitors are polarized with a (+) and (-) lead and must be installed in the correct orientation. Ordinarily, only the negative side is marked on the capacitor body with a dark band and the (-) sign clearly shown, while the PC boards will usually show the (+) hole location. Use care to ensure proper polarity. See the parts diagram for proper placement. The capacitor should fit snugly down to the PC board.

❒ 32. Install C1, noting the polarity.

❒ 33. While we are in the area, lets install C10,.01 uF disc (marked .01 or 103 or 10nF).

❒ 34. Install resistor R4, 270 ohm (red-violet-brown).

❒ 35. Install C4, 10 uF electrolytic capacitor. Be sure to orient the part correctly. See the parts layout diagram for proper placement.

Believe it or not, you're better than halfway done with your treasure finder! Take a short break to examine your work up until now. You have completed the two oscillators that are contained in the circuit. Well, that's enough of a rest, lets get back to work!

Next we'll work on the audio path for the output signal.

❒ 36. Install, C9, 220 uF (marked 220 uF). Again, this capacitor is polarized and should be placed in only one direction.

❒ 37. Jumping around a bit, also install electrolytic capacitor C12, 220 uF. Watch that polarity!

❒ 38. Using a scrap component lead, form a jumper wire and install in the JMP2 holes. Jumpers are like electronic "bridges" that carry signals over the PC board traces.

❒ 39. Install C13, .01uF disc capacitor (marked .01 or 103 or 10nF).

❒ 40. Install U2, the LM386 audio amp IC. Make sure to align the notch or dot associated with pin one with the notch shown in the parts layout diagram. Also check to be sure all 8 pins are through the board before soldering the IC in place.

❒ 41. Using a scrap component lead, form a jumper wire and install in the JMP1 holes.

❒ 42. Identify and install R9, the 2 ohm (red-black-gold) resistor.

❒ 43. Install C14, .1uF disc capacitor (marked .1 or 104).

❒ 44. Install R10, 120 ohm (brown-red-brown).

❒ 45. Install the 9V battery connector to the “RED” and “BLK” holes, respectively.

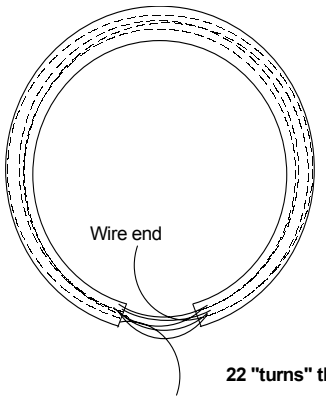
❒ 46. Install the 9V battery clip using a scrap component lead to hold it on the PC board. Once the leads are soldered on the solder side of the PC board, you can solder the component lead to the bottom of the battery clip for better mechanical stability.

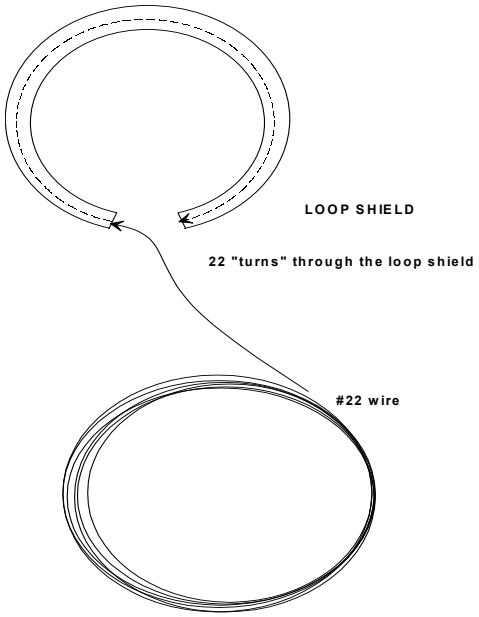
Whew! That's about it for the main circuit board assembly. Take a few minutes now to double check your work, especially the placement of the polarized and orientation specific components. The next time we visit this board we’ll be ready to energize the circuit, so this is your last chance to “get it right the first time” and avoid timely circuit troubleshooting. Remember that time spent here can save a lot of time (and expense!) when the unit is initially turned on.

ASSEMBLY INSTRUCTIONS FOR THE SEARCH COIL

It time to get that all important search coil “wound up”. Here’s some instructions for getting it done.

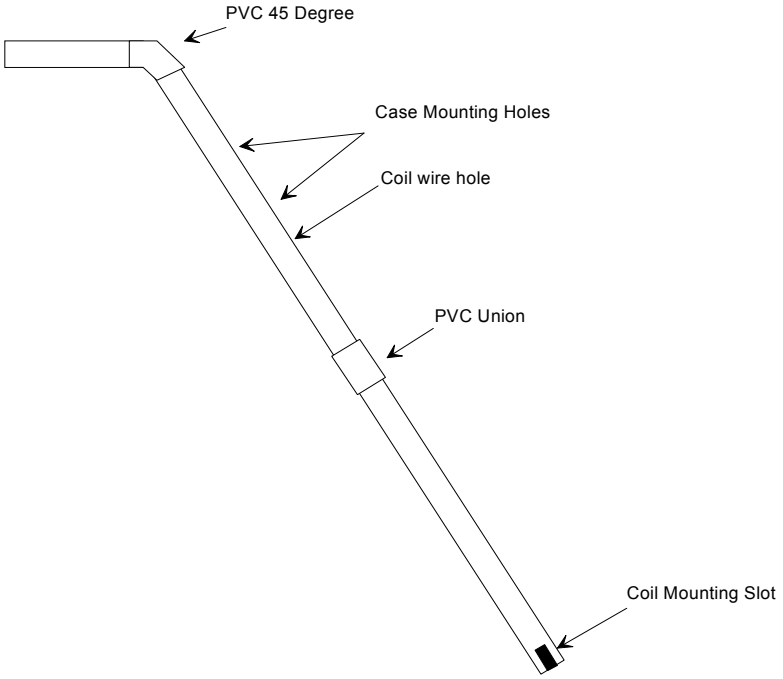
❒ 1. It is now time to start winding your magnet wire through the shield. Hang up the “Do Not Disturb “ sign, or mark down as you accomplish each complete turn through the coil. It is extremely important that you do not scrape the enamel coating off the wire when passing it through the loop shield. When you complete the first pass through the coil shield, leave yourself a few inches of wire for interconnection to the coaxial cable. Taking the other end of the coax, continue threading the wire back through the coil shield for 21 turns (a total of 22 turns). When you finish up rolling your own coil, leave yourself a few inches on the other end, as well. Next up we’ll prepare to connect our length of coaxial cable to the search coil and the previously constructed circuit board. This is the fun part. We get to piece together the PVC sections of pipe to begin





forming our treasure finder!

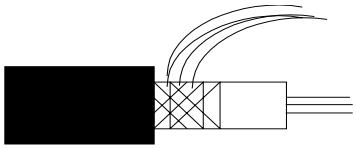
❒ 2. Fit together the pre drilled sections of PVC tubing as shown. DO NOT GLUE THE PVC TOGETHER AT THIS TIME. This is our first fitting and we want to be sure everything is just right before we finalize the tubing.



❒ 3. With the PVC pushed together, slip the mini coaxial cable through the coil wire hole, as shown, and feed the wire through until it falls through the coil mounting slot. *Be sure to leave yourself at least 6 inches of extra wire at each opening for final assembly.*

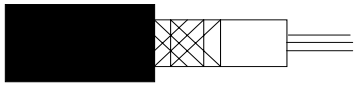
Next we'll prepare the ends of the coaxial cable for final assembly. Usually a good sharp knife or razor cutter does a good job at removing the outer insulation. Use caution as not to cut too deeply into the "braid" of the coax. Note also that each end of the cable will be prepared slightly differently; follow the drawing for the correct end types.

❒ 4. Prepare each end of the RG-174 mini coax as shown. One end needs to have the shield wires pulled out away from the inner shield and center conductor so that it can be soldered to the search coil ground. You will want to "tin" the loose wires of the outer braid and center conductors to avoid frayed wire ends. Use caution not to overheat the braid or center conductor wires as this may cause the insulation to melt. Use quick, definite movements with your soldering iron to avoid overheating the wires.



Cable Preparation

Coil Connection End

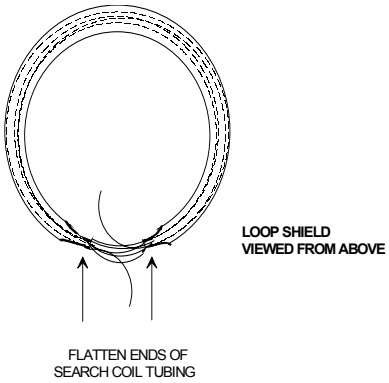


Cable Preparation

PC Board End

❒ 5. Now on to mounting the coax to the search coil. First we need to finalize the assembly of the coil by "crimping" both open ends of the copper tubing so that the coil will fit into the slots cut in the PVC tubing. Use pliers to **gently** form the end of the copper tubing at the proper angle (notice that this will determine the angle at which the search coil will affix to the slot). A good "rule of thumb" is to leave the coil on a horizontal surface and crimp slightly off perpendicular to the table top.

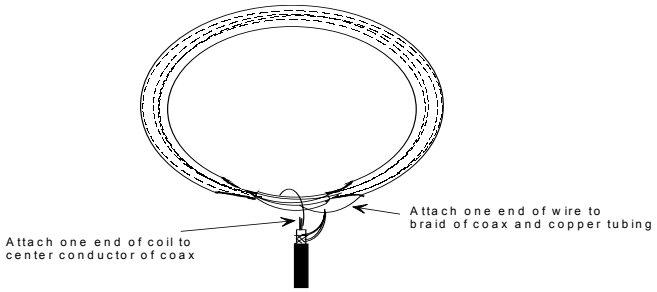
❒ 6. The next task is to remove the enamel from the ends of the coil wire. You may scrape the enamel off with your hobby knife, or gently sand off the enamel with a piece of fine sandpaper. "Tin" the ends of the



enameled wire with solder for easy connections later.

Well you've almost made it to the completion of your treasure finder. Just a few more steps and you will be beachcombing!

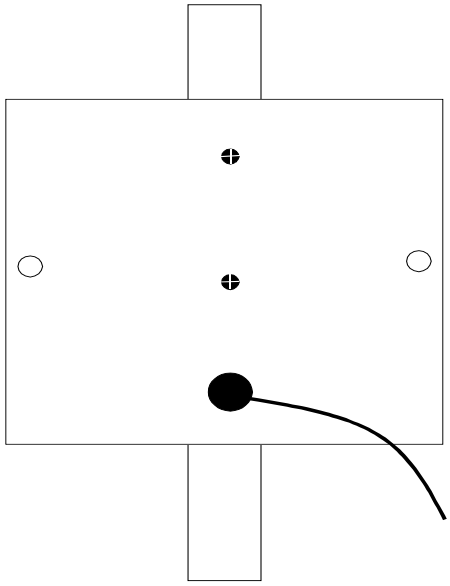
❒ 7. Now we'll attach the coaxial cable to the coil assembly. Affix the center conductor of the coax to one end of the search coil. You may want to insulate this connection with some electrical tape after you have verified



that it is a good solder connection.

❒ 8. The final connection to the coil assembly will connect the remaining end of the coil, the braid of the coaxial cable, and the copper tubing (to complete the "Faraday shield " for the search coil. Again be careful not to overheat the ground shield of the cable, as the center conductor

insulation may overheat and cause a short in the cable. Once your soldering is complete you may slide the crimped ends of the coil into the slots cut in the PVC tubing and insert the PVC endcap supplied with your kit.



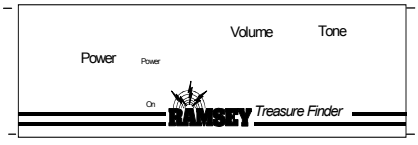
❒ 9. Now we'll affix the bottom half of the case to the pre drilled PVC tubing. Using the two #6 self tapping screws provided and running the circuit board prepared cable through the third hole, screw the bottom half of the case into place.

❒ 10. For our final cable solder connection, we'll affix the prepared end of the coaxial cable assembly to the *SOLDER SIDE of the PC Board.* Notice the provisions on the board to lay the cable in place and affix two jumper wires across the ground braid to hold it firmly in place. The center conductor should be soldered to the input pad connection at capacitor C3, as shown in the parts placement diagram.

❒ 11. Using the speaker wire and the mini speaker provided, solder the wires to the input terminals of the speaker and then to the speaker terminals on the circuit board.The speaker has double-stick tape attached to it; use this to attach the speaker to the case bottom.

❒ 12. With the pre-punched plastic panels provided, carefully affix the two stickers for the front and rear panel into place.

❒ 13. Carefully slide the excess cable back through the hole and mount the printed circuit board in the case. Be sure to install the front and rear panels at this time.



CONGRATULATIONS

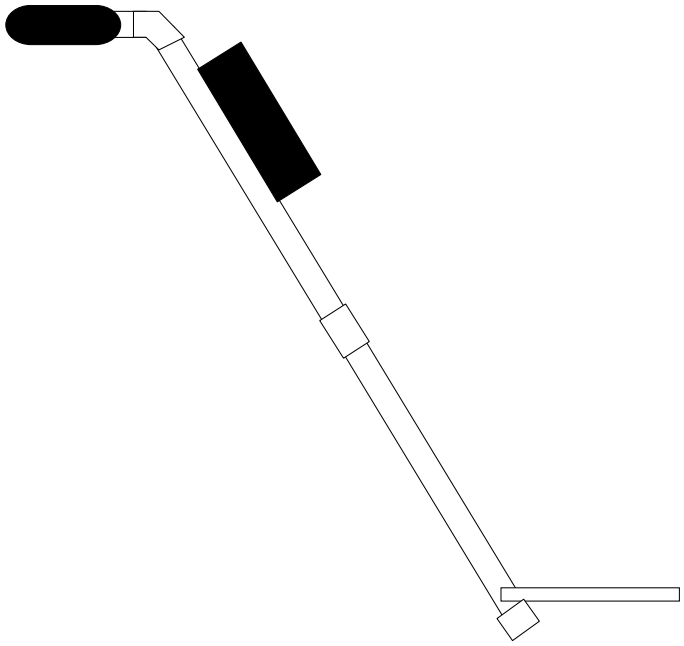
Your treasure finder is now complete! Have a final look over your work, paying particular attention to the orientation of diodes, transistors and IC's.

INITIAL TESTING OF THE METAL DETECTOR

This kit was purposefully designed to "plug and play" with minimal testing upon completion. Install a fresh nine volt battery and depress the power switch. The power on led should illuminate. Turn the volume control to about half, and adjust the tone control. Center the tone control knob on the front panel and adjust L2 by turning the slug down into the form. As you turn the slug the tone will start out high and get lower as you continue turning. Stop turning the slug when the tone is too low in frequency to hear. Move the search coil near a metal object, and the pitch of the tone should change.

FINAL ASSEMBLY

Now that you have made some initial checks, it's time to finish the mechanical assembly. Install the foam grip handle and the cover on the circuit board. You may wish to glue the 45 degree PVC elbow into place, but we recommend that you do not glue at the union or endcap (for future accessibility to the coil).



TROUBLESHOOTING INSTRUCTIONS

While we had hoped that it wouldn't come to this, if you are having trouble with your treasure finder here are a few suggestions.

Use a methodical, logical troubleshooting technique. Most problems can be solved using common sense. A volt-ohm meter and a clear head are usually all that are needed to correct any problem. Most problems are due to misplaced parts and/or bad solder connections. Working backwards through the assembly steps will often lead you to the problem.

Please understand that it is nearly impossible to "troubleshoot" by phone, any specific questions should be documented and sent to us by mail.

TREASURE FINDING!

Now you're all set and ready to go treasure finding. Try a few "test treasures" in your backyard to get used to how the search coil works. You may be able to start to hear the differences between different types of metal, as well. Try it out with the headset and you'll begin detecting like the pro's.

CONCLUSION

We sincerely hope that you enjoy the use of this Ramsey product. As always, we have tried to compose our manual in the easiest, most “user friendly” format that is possible. As our customers, we value your opinions, comments, and additions that you would like to see in future publications. Please submit comments or ideas to:

Ramsey Electronics Inc.
Attn. Hobby Kit Department
793 Canning Parkway
Victor, NY 14564

And once again, thanks from the folks at Ramsey!

The Ramsey Kit Warranty

Please read carefully BEFORE calling or writing in about your kit. Most problems can be solved without contacting the factory.

Notice that this is not a "fine print" warranty. We want you to understand your rights and ours too! All Ramsey kits will work if assembled properly. The very fact that your kit includes this new manual is your assurance that a team of knowledgeable people have field-tested several "copies" of this kit straight from the Ramsey Inventory. If you need help, please read through your manual carefully, all information required to properly build and test your kit is contained within the pages!

1. DEFECTIVE PARTS: It's always easy to blame a part for a problem in your kit, Before you conclude that a part may be bad, thoroughly check your work. Today's semiconductors and passive components have reached incredibly high reliability levels, and its sad to say that our human construction skills have not! But on rare occasion a sour component can slip through. All our kit parts carry the Ramsey Electronics Warranty that they are free from defects for a full ninety (90) days from the date of purchase. Defective parts will be replaced promptly at our expense. If you suspect any part to be defective, please mail it to our factory for testing and replacement. Please send only the defective part (s), not the entire kit. The part(s) MUST be returned to us in suitable condition for testing. Please be aware that testing can usually determine if the part was truly defective or damaged by assembly or usage. Don't be afraid of telling us that you 'blew-it', we're all human and in most cases, replacement parts are very reasonably priced.

2. MISSING PARTS: Before assuming a part value is incorrect, check the parts listing carefully to see if it is a critical value such as a specific coil or IC, or whether a RANGE of values is suitable (such as "100 to 500 uF"). Often times, common sense will solve a mysterious missing part problem. If you're missing five 10K ohm resistors and received five extra 1K resistors, you can pretty much be assured that the '1K ohm' resistors are actually the 'missing' 10 K parts ("Hum-m-m, I guess the 'red' band really does look orange!") Ramsey Electronics project kits are packed with pride in the USA. If you believe we packed an incorrect part or omitted a part clearly indicated in your assembly manual as supplied with the basic kit by Ramsey, please write or call us with information on the part you need and proof of kit purchase.

3. FACTORY REPAIR OF ASSEMBLED KITS:
To qualify for Ramsey Electronics factory repair, kits MUST:
1. NOT be assembled with acid core solder or flux.
2. NOT be modified in any manner.
3. BE returned in fully-assembled form, not partially assembled.
4. BE accompanied by the proper repair fee. No repair will be undertaken until we have received the MINIMUM repair fee (1/2 hour labor) of $50.00, or authorization to charge it to your credit card account.
5. INCLUDE a description of the problem and legible return address. DO NOT send a separate letter; include all correspondence with the unit. Please do not include your own hardware such as non-Ramsey cabinets, knobs, cables, external battery packs and the like. Ramsey Electronics, Inc., reserves the right to refuse repair on ANY item in which we find excessive problems or damage due to construction methods. To assist customers in such situations, Ramsey Electronics, Inc., reserves the right to solve their needs on a case-by-case basis.
The repair is $36.00 per hour, regardless of the cost of the kit. Please understand that our technicians are not volunteers and that set-up, testing, diagnosis, repair and repacking and paperwork can take nearly an hour of paid employee time on even a simple kit. Of course, if we find that a part was defective in manufacture, there will be no charge to repair your kit (But please realize that our technicians know the difference between a defective part and parts burned out or damaged through improper use or assembly).
4. REFUNDS: You are given ten (10) days to examine our products. If you are not satisfied, you may return your unassembled kit with all the parts and instructions and proof of purchase to the factory for a full refund. The return package should be packed securely. Insurance is recommended. Please do not cause needless delays, read all information carefully.

Treasure Finder Metal Detector
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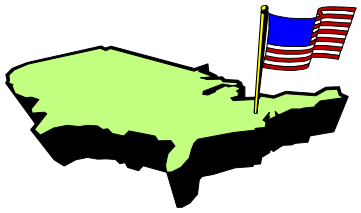

This Quality Electronics Kit
was designed and packed
in the USA

Price: $5.00
Ramsey Publication No. MTF-1
Instruction manual for:
RAMSEY MODEL NO. TF-1
TREASURE FINDER METAL DETECTOR

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